



# **STOCKPILE REPORT**

## **to the Congress**



**JANUARY - JUNE 1961**

**EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF EMERGENCY PLANNING**

**WASHINGTON 25, D.C.**



EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF EMERGENCY PLANNING  
Washington 25, D. C.

Office of the Director

October 1961

The Honorable  
The President of the Senate

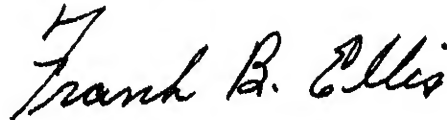
The Honorable  
The Speaker of the House of Representatives

Sirs:

There is presented herewith the semiannual report to the Congress on the strategic and critical materials stockpiling program for the period January 1 to June 30, 1961. A classified statistical supplement to this report has been transmitted to you under separate cover.

This report is submitted pursuant to Section 4 of the Strategic and Critical Materials Stock Piling Act, Public Law 520, 79th Congress.

Sincerely,

A handwritten signature in cursive script that reads "Frank B. Ellis". The signature is written in dark ink and is positioned above the printed name of the Director.

Director

## **Preface**

This report, which discusses developments during the period January 1 through June 30, 1961, refers to the Office of Civil and Defense Mobilization (OCDM) as the agency responsible during that period for the stockpile under the Strategic and Critical Materials Stock Piling Act, Public Law 520, 79th Congress.

On September 22, 1961, the Office of Civil and Defense Mobilization was reconstituted as the Office of Emergency Planning, in the Executive Office of the President.

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## Summary

This report covers principal activities in stockpile planning and operations for the period January 1 through June 30, 1961, under the provisions of Public Law 520 (79th Congress), The Strategic and Critical Materials Stock Piling Act.

Strategic stockpile inventories of the 76 materials on the stockpile list as of June 30 approximately equaled or exceeded maximum objectives for 52 materials and basic objectives for 62 materials. Additional quantities in other Government inventories, if added to the strategic stockpile, would change these totals to 63 for the maximum objectives and 69 for the basic objectives. Quantities on order would complete 4 additional maximum objectives and 3 additional basic objectives.

At the end of the report period the total strategic stockpile inventory of specification-grade materials was valued at \$5,678,000,000 on the basis of June 30, 1961, market prices. Application of the inventory to the stockpile objectives is shown in Chart 1.

Materials valued at approximately \$3,212,000 were delivered to the strategic stockpile, as a result of previous commitments—including repayments on foreign aid development loans. Of this amount, \$1,754,400 was applicable to strategic stockpile objectives in effect as of June 30, the remainder having been committed under previously higher objectives.

Purchase commitments executed during the January-June period for additional materials for the strategic stockpile were valued at \$274,000. Materials still on order for the strategic stockpile at the end of the period were valued at \$4,619,000, with \$896,500 of this applicable to stockpile objectives. In addition, contracts were executed for the upgrading of Government-owned materials to higher use forms, the processing costs amounting to about \$3,200,000.

Between January and June, cash commitments for deliveries of materials to the Defense Production Act (DPA) inventory in excess of maximum objectives, were reduced by more than \$2,500,000, bringing to approximately \$396,000,000 the total contract reductions for the strategic stockpile and the DPA inventory since the beginning of fiscal year 1958.

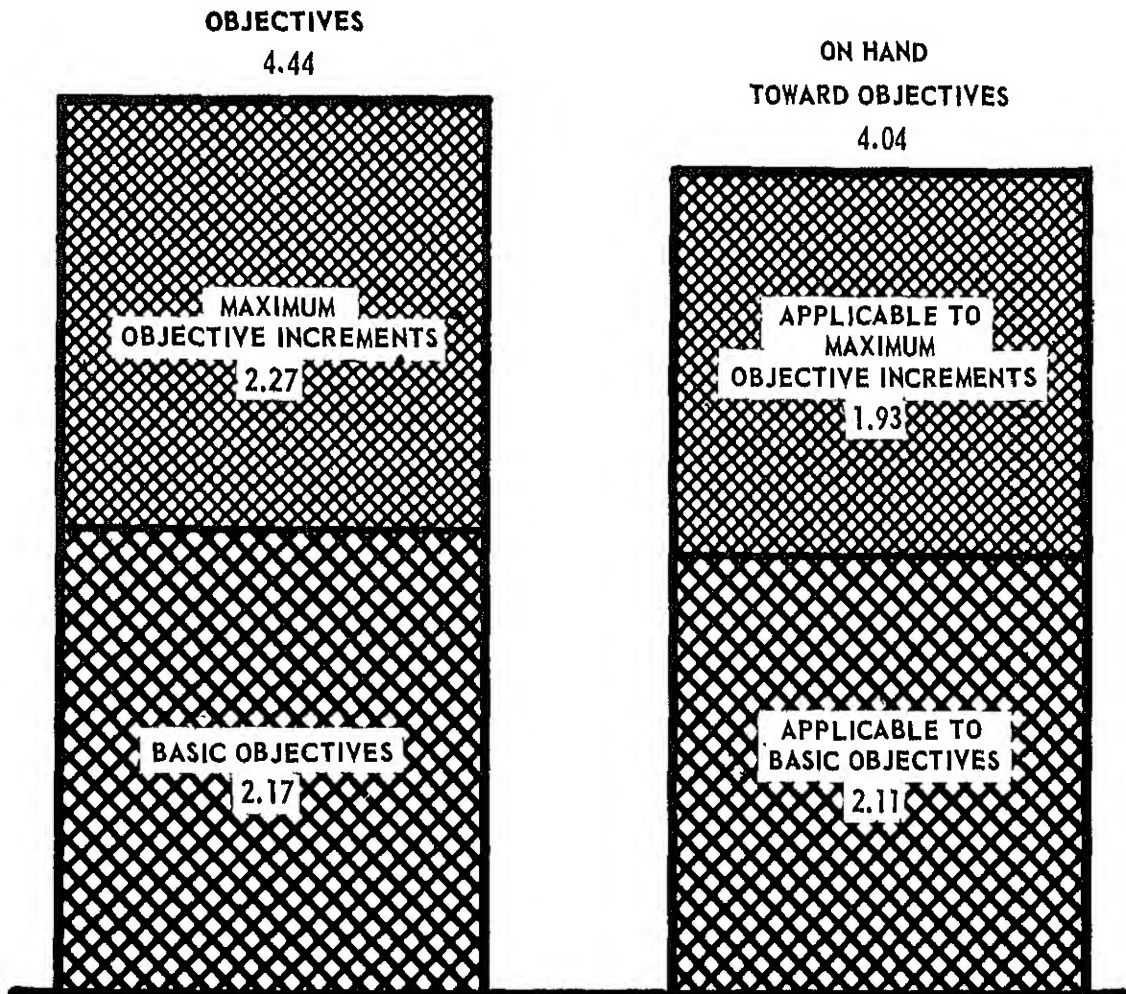
Sales commitments for disposal of off-grade and excess materials from the strategic stockpile and DPA inventories for the six months' period totaled about \$27,345,000, with approximately \$13,971,000 of this representing disposals from the strategic stockpile.

CHART 1

STOCKPILE OBJECTIVES AND APPLICABLE STRATEGIC STOCKPILE INVENTORIES

AS OF JUNE 30, 1961

( IN BILLIONS OF DOLLARS, BASED ON JUNE 30, 1961, MARKET PRICES )



*Excess quantities of certain specification-grade materials in the strategic stockpile, valued at \$1.64 billion, and outstanding commitments valued at \$4.62 million, are not included.*

*See Appendix C, item II, for other Government-owned inventories, totaling \$369 million, that are considered applicable to stockpile objectives.*





# Status of Strategic Stockpile Inventories

## ACHIEVEMENT OF STOCKPILE OBJECTIVES

On June 30, 1961, as shown by Table A, strategic stockpile inventories of materials for which there are official stockpile objectives equaled or exceeded the maximum objectives for 52 materials and the basic objectives for 62 materials. Total dollar values of the objectives and the applicable strategic stockpile inventories are shown in Chart 1.

Quantities of materials in other Government-owned inventories, if transferred to the strategic stockpile, would increase to 63 the number of maximum objectives and to 69 the number of basic objectives met by total quantities on hand as of June 30. Quantities on order for all inventories would complete 4 additional maximum objectives and 3 additional basic objectives.

Total specification-grade inventories of materials in the strategic stockpile for which there are basic and maximum objectives, at the end of the report period were valued at \$5,678,000,000 on the basis of June 30 market prices, compared with an acquisition cost of \$5,800,000,000. The greater part of the change from the December 31, 1960, market valuation of \$5,556,000,000 is due to increased prices for tin, nickel, copper and molybdenum. Excess specification-grade materials in the strategic stockpile are now valued at \$1,639,000,000 as against \$1,580,000,000 shown on December 31, representing quantities acquired against previously higher objectives. Materials in other Government inventories considered applicable to stockpile objectives were valued at \$368,903,000. For a dollar value summary of the various Government inventories, see Appendix C.

Table A, following, shows the List of Strategic and Critical Materials for Stockpiling. Achievement of stockpile objectives is shown in this table only if the materials are actually in the strategic stockpile. Footnotes show when other Government inventories, if combined with strategic stockpile quantities, would complete the stockpile objectives. Also footnoted are those materials for which upgrading objectives in effect as of June 30 had not been achieved.

## OTHER MATERIALS IN STRATEGIC STOCKPILE INVENTORY

In addition to inventories of specification-grade materials, the strategic stockpile contains (1) non-specification grades of materials for which there are stockpile objectives and (2) materials that have been removed from the stockpile list and others for which there are no objectives. Quantities of

Table A

### List of Strategic and Critical Materials for Stockpiling and Achievement of Stockpile Objectives

Materials	Strategic Stockpile inventory equals or exceeds	
	Basic objective	Maximum objective
1. Aluminum.....	x	( <sup>1</sup> )
2. Aluminum Oxide, Fused, Crude.....	( <sup>1</sup> )	x
3. Antimony.....	( <sup>1</sup> )	( <sup>2</sup> )
4. Asbestos, Amosite.....	( <sup>2</sup> )	( <sup>2</sup> )
5. Asbestos, Chrysotile...	( <sup>2</sup> )	( <sup>2</sup> )
6. Bauxite, Metal Grade, Jamaica Type.....	( <sup>1</sup> )	( <sup>1</sup> )
7. Bauxite, Metal Grade, Surinam Type.....	x	( <sup>1</sup> )
8. Bauxite, Refractory Grade.....	x	x
9. Beryl.....	x	x
10. Bismuth.....	( <sup>1</sup> )	( <sup>1</sup> )
11. Cadmium.....	x	x
12. Castor Oil.....	x	( <sup>3</sup> )x
13. Celestite.....	x	( <sup>3</sup> )x
14. Chromite, Chemical Grade.....	x	x
15. Chromite, Metallurgical Grade.....	x	x
16. Chromite, Refractory Grade.....	x	x
17. Cobalt.....	x	x
18. Columbium.....	x	( <sup>3</sup> )x
19. Copper.....	x	( <sup>3</sup> )x
20. Cordage Fibers, Abaca..	x	x
21. Cordage Fibers, Sisal..	x	x
22. Corundum.....	x	x
23. Diamond Dies, Small....	( <sup>2</sup> )	( <sup>2</sup> )
24. Diamond, Industrial: Crushing Bort.....	x	x
25. Diamond, Industrial: Stones.....	x	( <sup>1</sup> )
26. Feathers and Down, Waterfowl.....	x	x
27. Fluorspar, Acid Grade..	x	x
28. Fluorspar, Metallurgical Grade.....	x	x
29. Graphite, Natural--Ceylon, Amorphous Lump.....	x	x
30. Graphite, Natural--Madagascar, Crystalline..	x	x
31. Graphite, Natural--Other than Ceylon and Madagascar, Crystalline.....	x	x

Materials	Strategic Stockpile inventory equals or exceeds	
	Basic objective	Maximum objective
32. Hyoscine.....	x	x
33. Iodine.....	x	
34. Jewel Bearings.....		
35. Kyanite-Mullite.....	x	x
36. Lead.....	x	x
37. Magnesium.....	x	x
38. Manganese, Battery Grade, Natural Ore....	x	x
39. Manganese, Battery Grade, Synthetic Dioxide.....	x	x
40. Manganese, Chemical Grade, Type A Ore....	x	x
41. Manganese, Chemical Grade, Type B Ore....	( <sup>1</sup> )	( <sup>2</sup> )
42. Manganese, Metallurgical Grade.....	x	( <sup>1</sup> ) ( <sup>2</sup> )
43. Mercury.....	x	x
44. Mica, Muscovite Block, Stained A/B and Better	x	( <sup>1</sup> )
45. Mica, Muscovite Film, First and Second Qualities.....	x	( <sup>1</sup> )
46. Mica, Muscovite Splittings.....	x	x
47. Mica, Phlogopite Block	x	x
48. Mica, Phlogopite Splittings.....	x	x
49. Molybdenum.....	x	( <sup>3</sup> )x
50. Nickel.....	x	x
51. Opium.....	x	x
52. Platinum Group Metals, Iridium.....	x	x
53. Platinum Group Metals, Palladium.....	( <sup>1</sup> )	( <sup>1</sup> )
54. Platinum Group Metals, Platinum.....	x	x
55. Pyrethrum.....	x	x
56. Quartz Crystals.....	x	x
57. Quinidine.....	x	x
58. Rare Earths.....	x	x
59. Rubber, Crude Natural..	x	x
60. Rutile.....	x	( <sup>1</sup> )
61. Sapphire and Ruby	( <sup>1</sup> )	
62. Selenium.....	( <sup>1</sup> )	
63. Shellac.....	x	x
64. Silicon Carbide, Crude	( <sup>1</sup> )	( <sup>1</sup> )
65. Silk Noils.....	x	x
66. Silk, Raw.....	( <sup>2</sup> )	( <sup>2</sup> )
67. Sperm Oil.....	x	x
68. Talc, Steatite, Block and Lump.....	x	x
69. Tantalum.....	x	( <sup>1</sup> ) ( <sup>3</sup> )
70. Tin.....	x	x
71. Tungsten.....	x	( <sup>3</sup> )x
72. Vanadium.....	x	x
73. Vegetable Tannin Extract, Chestnut.....	x	x
74. Vegetable Tannin Extract, Quebracho.....	x	x

Materials	Strategic Stockpile inventory equals or exceeds	
	Basic objective	Maximum objective
75. Vegetable Tannin Extract, Wattle.....	x	x
76. Zinc.....	x	x

<sup>1</sup>Sufficient quantities are on hand in total Government-owned inventories to complete the objective.

<sup>2</sup>Total quantities on hand in and on order for all Government-owned inventories are sufficient to complete the objective.

<sup>3</sup>Although total quantities are equal to the maximum objective, the upgrading program has not been completed.

these materials on hand as of June 30 are shown in Tables B and C, following.

Many of the changes in the list since the last report result from disposals pursuant to OCDM authorizations. Some changes, however, are due to reclassification and other adjustments of the inventories. Shipments on commitments reported earlier as well as those shown in a later section of this report will further reduce some of the inventories.

Most of the nonspecification-grade stocks were acquired by transfer of Government-owned surplus materials. Some of these were taken under stockpile specifications now outmoded for such reasons as changes in industry practice and technological advances; others were taken with a view to processing them to specification grade if this were necessary in order to meet emergency demands.

Table B

*Strategic Stockpile Inventories of Nonspecification Grades of Materials for Which There Are Stockpile Objectives*

As of June 30, 1961

Material	Unit	Quantity
Aluminum.....	ST	1,787
Bauxite, Metal Grade, Surinam Type.....	LDT	24
Bismuth.....	Lb.	36,580
Cadmium.....	Lb.	1,582,186
Celestite.....	SDT	28,816
Chromite, Metallurgical Grade.	SDT	177
Columbium.....	Lb.	1,362,318
Diamond Dies, Small.....	Pc.	8,371
Fluorspar, Acid Grade.....	SDT	4,980
Graphite, Natural--Ceylon, Amorphous Lump.....	ST	28

Material	Unit	Quantity
Graphite, Natural--Madagascar, Crystalline.....	ST	1,907
Graphite, Natural--Other than Ceylon and Madagascar, Crystalline.....	ST	672
Jewel Bearings.....	Pc.	14,715,973
Magnesium.....	ST	5,460
Manganese, Metallurgical Grade	SDT	486,774
Mica, Muscovite Block, Stained A/B and Better.....	Lb.	348,467
Mica, Muscovite Film, 1st and 2d Qualities.....	Lb.	23,674
Mica, Phlogopite Block.....	Lb.	206,490
Nickel.....	Lb.	2,345,796
Opium.....	Lb.	2,180
Platinum Group Metals, Platinum.....	Tr.Oz.	4,930
Quartz Crystals.....	Lb.	921,818
Sapphire and Ruby.....	Kt.	1,786,244
Talc, Steatite, Block and Lump.....	ST	42
Tantalum.....	Lb.	1,857,394
Tungsten.....	Lb.	16,018,804
Vanadium.....	Lb.	313,710

Source of data: General Services Administration.

Table C

*Strategic Stockpile Inventories of Materials for Which There Are No Stockpile Objectives*

As of June 30, 1961

Material	Unit	Quantity
Agar.....	Lb.	13,261
Asbestos, Crocidolite (Soft)	ST	1,567
Bristles, Hog.....	Lb.	81,259
Coconut Oil.....	Lb.	200,399,920
Cotton, Extra Long Staple....	Bale	219,236
Diamond Dies, Other Than Small.....	Pc.	355
Diamond Tools.....	Pc.	64,178
Guayule Seeds.....	Lb.	16,017
Mica, Muscovite Block, Stained B and Lower.....	Lb.	4,619,614
Mica, Muscovite Film, 3d Quality.....	Lb.	512,254
Palm Oil.....	Lb.	35,151,548
Platinum Group Metals, Rhodium.....	Tr.Oz.	3,017
Platinum Group Metals, Ruthenium.....	Tr.Oz.	10
Poppy Seeds, Opium.....	Lb.	1,586
Quartz, Processed.....	Pc.	6,479,272
Quinine.....	Oz.	9,524,947
Quinine, Hydrochloride of....	Oz.	1,131,825
Silk Waste.....	Lb.	2,587,964
Talc, Steatite, Ground.....	ST	6,035
Totaquine.....	Oz.	7,819,216
Zirconium Ore, Baddeleyite...	SDT	16,533
Zirconium Ore, Zircon.....	SDT	12,952

Source of data: General Services Administration.

## Activities for the Period January-June 1961

### PROCUREMENT

The Strategic Stockpile Procurement Directive for FY 1961 to the General Services Administration was amended. The original authorization for upgrading tungsten ores and concentrates to hydrogen-reduced tungsten metal powder and to ferrotungsten was withdrawn when OCDM was unable to obtain complete interagency approval of the use of payment in kind to finance the cost of upgrading. Opportunities for barter appear favorable for the relatively small quantities of processed tungsten still needed. Additional upgrading of materials on hand was authorized as follows: metallurgical manganese ore to electrolytic manganese metal, molybdenite to ferromolybdenum and molybdic oxide, and castor oil to sebacic acid.

Some of the other materials for which basic and maximum stockpile objectives have not been met, either are being acquired by barter or are listed for barter in the event an opportunity for acquisition by that means should arise. Although the materials acquired by barter are ultimately placed in the supplemental stockpile, not the strategic stockpile, they are counted against the stockpile objectives as necessary. GSA is not usually authorized to acquire identical materials with Stock Piling Act funds when barter is feasible.

During the January-June period, the Department of Agriculture negotiated 53 barter contracts for strategic materials valued at approximately \$119,700,000. At the end of the period, the strategic materials in the CCC account and the supplemental stockpile, acquired by barter of surplus agricultural commodities, were valued at about \$1,000,000,000 on the basis of June 30 market prices. Of this amount, about \$210,000,000 was considered applicable to stockpile objectives. The decrease in value of barter inventories applicable to stockpile objectives, from the \$213,000,000 reported as of December 31, 1960, was due mainly to the receipt of materials in the strategic stockpile from foreign aid program development contracts. This eliminated the need for crediting certain barter inventories toward the stockpile objectives.

New commitments executed during the reporting period for additional materials for the strategic stockpile were valued at only \$274,000, at June 30 market prices. This entire amount was committed to open market purchases. In addition, contracts were executed for upgrading certain stockpile materials to higher use forms. Costs of

processing under these contracts are expected to total about \$3,200,000. Two of the contracts, however, contained provisions for payment-in-kind in lieu of cash at the Government's option.

The market value of outstanding deliveries was estimated on June 30 at \$4,619,000, compared to the \$9,900,000 value shown as of December 31, 1960.

Of the \$3,200,000 in materials delivered to the strategic stockpile during the six months' period, \$1,754,000 was applicable to stockpile objectives. The excess deliveries of approximately \$1,458,000, comprised of \$184,000 from open market purchases and \$1,274,000 from foreign aid programs, were the result of commitments made against stockpile objectives that were later reduced.

### PURCHASE SPECIFICATIONS AND SPECIAL INSTRUCTIONS

During the January-June period, the Office of Civil and Defense Mobilization issued three new and eight revised purchase specifications. (See Appendix B.) In addition, two new and six revised special instructions were issued to the General Services Administration, giving guidance on the stockpiling of strategic and critical materials.

### REDUCTION OF COMMITMENTS

Government cash commitments for delivery of materials that would be surplus to maximum stockpile objectives were reduced by over \$2,500,000 during the six months' period ending June 30. The entire amount represented Defense Production Act contract reductions.

Total reductions for the strategic stockpile and the DPA inventory, from the beginning of fiscal year 1958 to June 30, 1961, amounted to approximately \$396,000,000. Of this amount, approximately \$57,877,000 has been for strategic stockpile commitments and \$338,000,000 for DPA commitments.

### DISPOSAL PROGRAMS

Notices of intent to dispose of 18 materials from the strategic stockpile and 2 from the DPA inventory, listed below, were published within the period of this report. Eleven disposals required express Congressional approval (indicated by asterisks), and two of these, nickel-cobalt-copper calcines and nickel matte, were cleared by the Congress.

### Strategic Stockpile

residues	Nickel powder (sintered)*
ite*	Cobalt metal (rondelles)*
fiber, abaca*	Quartz Crystals (partially processed)
fiber, sisal*	Quartz crystals (below grade)
rs and down, fowl	Sapphire (natural and synthetic)
ne	Talc, steatite (block and lump)
-cobalt-copper nes*	Vegetable tannin, chestnut*
matte*	Vegetable tannin, quebracho*
metal (low-)*	Vegetable tannin, watle*

### DPA inventory

Columbium-bearing tin slags  
Manganese residues

As commitments during the six months' period disposal of excess and off-grade materials the strategic stockpile and the DPA inventory d approximately \$22,708,000. Of this amount, \$13,971,000 represented disposals from the pile and about \$8,737,000 from the DPA inventory (exclusive of the sale of nickel from the Government's former plant operations in . The materials disposed of were:

	Platinum group metals:
ra	Osmium
um-magnesium scrap	Rhodium
it oil	Ruthenium
.	Quinidine
ers and down	Quinine and totaquine
le seeds	Rubber
ine	Silk waste
te-mullite	Talc
l	Vanadium
	Zircon concentrates

ulative sales of materials from the strategic stockpile and the DPA inventory as of June totaled \$834,776,000. This amount does not e the value of materials released by the dent for the common defense, sales of DPA 'als to the strategic stockpile nor sales of . S. Government's former nickel production .a.

### **KPILE STORAGE**

#### **ile Security**

ised Policies and Criteria for the Selection rage Sites for Stockpile Materials (classified) issued on April 21, 1961. These policies use of a new system for identifying the ble environment of a geographical area during ssive nuclear weapon attack upon the United . The new system permits a security evaluation of thousands of locations and supersedes a d, in use since 1955, which employed a list out 100 major target areas. The attack en-

vironment is expressed percentagewise in probabilities of overpressure and radioactivity.

Each stockpile material has been assigned a maximum environmental value at which the material will survive. A comparison of the survival level for a material with the estimated probable attack environment at a proposed storage location provides a security identification. A minimum acceptable security level has also been established for each stockpile material.

The relative security of each stockpile material is being evaluated by application of the revised policies. Preliminary results of the study as of June 30 indicated a need to relocate some of the destructible-type materials to safer locations.

### **Storage Arrangements and Activity**

Strategic and critical materials were stored at 213 locations on June 30, as follows:

Type of facility	Number of locations	Net change in last 6 months
Military depots.....	58	-1
GSA depots.....	22	0
Other Government-owned sites.....	10	0
Industrial plantsites....	39	0
Leased commercial sites..	16	0
Commercial warehouses....	68	-1
Port storage sites.....	0	0
	<u>213</u>	<u>-2</u>

As of June 30, about 46,000,000 tons of materials were stored at the above-listed facilities, 2,400,000 tons of which were received during the six months' reporting period. Of the new receipts only about one percent went into the strategic stockpile and so this stockpile remained around 26,000,000 short tons. The highest percentage (91%) was materials for the Commodity Credit Corporation's account, leaving about eight percent that went into the DPA inventory.

As some of the materials being delivered were excess to established stockpile objectives, renewed emphasis was placed on the selection of storage locations that incur minimum inland transportation costs. For example, there was no inland transportation to three of the five locations to which bauxite was delivered since oceangoing vessels or barges are discharged at these sites.

Qualitative maintenance continues as an important factor in the overall management of materials in storage. During the reporting period 140 new preservation and maintenance projects were initiated and 112 projects previously authorized were completed.

Of significant interest to the stockpile program was the Department of Defense announcement concerning deactivation of several military installations at which stockpile materials are stored. Studies were initiated by GSA to determine the disposition to be made of strategic materials stored at three of the depots scheduled for complete deactivation.

## Notes on Strategic and Critical Materials

### AGAR

During the period January through June 1961, approximately 7,000 pounds of agar was sold from the stockpile for \$4,669. There remains for disposal about 13,000 pounds.

### ALUMINA

Over 100 tons of alumina was sold from the stockpile during this period for \$4,500. A contract was being negotiated at the end of June for the sale of about 1,500 tons which is the remainder authorized for disposal.

### ALUMINUM

Between January and June, 27,832 short tons of primary aluminum was delivered to the Government under the one contract that remains open for this metal under the Defense Production Act expansion program.

### ASBESTOS

The Government continued action toward evaluation of the domestic supply of chrysotile asbestos to determine the suitability of the material for meeting emergency manufacturing requirements for electrical insulation. In an effort to encourage domestic producers to supply fiber of suitable quality, strategic stockpile contracts have been limited in the last few years to domestic sources. Out of three stockpile contracts negotiated in fiscal year 1960, only a small percentage of the deliveries has been accepted as meeting stockpile specifications. Domestic users of chrysotile asbestos for electrical insulation purposes generally do not use the domestically produced crude asbestos. However, as of June 30 it was planned to seek the consuming industry's cooperation in performance testing to assure that domestic fiber taken for the stockpile would be usable.

### BAUXITE

Notice of the plan to dispose of 24 short tons of bauxite residues from the stockpile was published in the Federal Register in January.

### BERYLLIUM

The Department of the Interior continued its widespread and intensified search for deposits of domestic beryllium ore and its extensive research on developing milling methods for low-grade beryl, bertrandite, phenacite and associated valuable minerals, and on techniques to produce and purify

beryllium metal. Several companies and individuals interested in beryllium had programs ranging from ore discovery to developing new uses of the metal.

Under the Domestic Beryl Purchase Program, 188 short tons of beryl was purchased between January and June, making a total of 2,908 tons in purchases toward the 4,500 tons allowed by the termination date of June 30, 1962.

### BRISTLES, HOG

There was no sale activity during this period. The total disposals stand at about 3,500,000 pounds, sold for \$23,200,000. The remaining quantity--less than 10,000 pounds--will be offered for sale on a competitive basis. It has been determined that the bristles cannot be used advantageously by the Government.

### CADMIUM-MAGNESIUM

About 4,400 short tons of cadmium-magnesium bomb scrap was disposed of from the stockpile, with a recovery of about \$1,400,000. Bids received September 1960 on the first offering had been rejected as not responsive.

### CASTOR OIL

The Department of Agriculture continued its production research program on castor beans, to develop new varieties of hybrids with superior productive ability, higher oil content and greater disease resistance, and to determine the most effective methods of production.

### CELESTITE

Notice was published in the Federal Register on March 16, 1961, of the Government's intention to dispose of 28,816 short tons of celestite from the stockpile. The express approval of the Congress will be required for this disposal.

### CHROMITE

Still being evaluated at the end of June were bids opened on June 19 covering 46,138 long tons of chromite and 151,000 pounds of ferrochrome alloys to be disposed of from the stockpile, in accordance with the Federal Register notice of September 27, 1960.

### COBALT

Sealed bids were opened on May 19, 1961, on the offering of approximately 97,768 pounds of

cobalt ore, 59,225 pounds of cobalt carbonates, oxides and metallics, and 5,127 pounds of cobalt metal. Awards were made to the highest bidder on each of these items disposed of from the strategic stockpile, and the 162,120 pounds of cobaltiferous material was sold for \$21,490.

#### *COCONUT OIL*

During the six months' report period over 18,000,000 pounds of coconut oil was sold at a total value of over \$2,000,000. The remaining 179,600,000 pounds to be disposed of will be offered at the rate of approximately 14,000,000 pounds at six-week intervals.

#### *COLUMBIUM-BEARING TIN SLAGS*

No acceptable bids were received on the 18,700 long tons of columbium-bearing tin slags advertised in January for sale from the DPA inventory. Offers on a negotiated basis were being considered as of June 30.

#### *CORDAGE FIBERS*

Approximately 13,810,000 pounds of abaca, with a contract value of \$3,521,000, and 21,398,000 pounds of sisal, with a value of \$2,339,000, were rotated during the January-June period. This brings the total rotation of these materials for fiscal year 1961 to 17,325,000 pounds of abaca and 26,580,000 pounds of sisal.

A plan was published in the Federal Register of January 26 for the disposal of 7,500,000 pounds of abaca and 10,000,000 pounds of sisal which are in excess of the stockpile objectives for these fibers. Express Congressional approval of the disposals will be required.

#### *COTTON*

Cotton was removed from the List of Strategic and Critical Materials for Stockpiling in March 1957. On June 30, 1961, legislation was still pending in the Congress for the disposal of approximately 200,000 bales of extra long staple cotton surplus to stockpile needs. Of the 50,000 bales transferred to the Department of Agriculture, with Congressional approval (Public Law 85-96), approximately 29,000 bales have been sold with a gross return of about \$7,600,000.

#### *DIAMOND DIES*

No bids were received from domestic producers of diamond dies in response to either of GSA's two invitations for quantities within the OCDM fiscal year 1961 stockpile procurement directive. The full quantity, therefore, was awarded to a supplier of foreign dies. Under previous contracts, three suppliers of domestic dies and all suppliers of foreign dies have been making deliveries. However, the high percentage of rejections continued because of nonconformance with stockpile specifications.

#### *FEATHERS AND DOWN*

About 566,000 pounds of waterfowl feathers and down was disposed of between January and June, with proceeds amounting to \$447,000. This brings to 1,786,435 pounds the total quantity disposed of out of the 1,930,000 pounds authorized in 1960, with total recovery of \$753,000. Of the cumulative quantity, about 254,000 pounds of the materials has been disposed of on the open market and 1,532,000 pounds has been transferred for direct Government use. A plan for the disposal of an additional 2,000,000 pounds from the stockpile was published in the Federal Register on April 6, 1961. Removal of this excess may not commence until October, unless legislation permitting earlier action is enacted by the Congress.

#### *HYOSCINE*

During the January-June period, 1,040 ounces of surplus hyoscine was sold from the strategic stockpile for a total of \$11,440, leaving 2,018 ounces to be disposed of under OCDM's disposal authorization of October 1958. Pursuant to a second OCDM authorization, a plan to dispose of an additional 1,500 ounces was published in the Federal Register on April 28.

#### *JEWEL BEARINGS*

An intensive review of the Government's jewel bearings program was begun during the six months' reporting period. In March, the Director of OCDM appointed a high-level non-Government committee, with General Omar N. Bradley as chairman, to review the jewel bearings program and make recommendations on ways and means of maintaining a domestic production mobilization base at minimum cost to the Government. The Government-owned, privately operated production facility at Rolla, North Dakota, is a prime factor in this advisory committee's considerations. The committee is expected to complete its study and make its report to the Director of OCDM by October.

A strategic stockpile contract and orders for jewel bearings for military instruments continued to support the Rolla facility, through June 30. Orders are on the increase as a result of a recent amendment to the Armed Services Procurement Regulations requiring military contractors and subcontractors to obtain their jewel bearings from the Rolla plant except when such bearings are for incorporation in standard commercial items not acquired specifically to fulfill Government contracts or are for overseas delivery.

#### *KYANITE-MULLITE*

A total of 2,334 short tons has been sold out of the 7,326 short tons of the kyanite-mullite authorized for disposal from the strategic stockpile, 986 tons having been sold during this reporting period.



## MICA

The Bureau of Mines project under the synthetic mica research program terminated on June 30, and the private contractor's project was to be completed by the end of July. Tube spacer material developed under this program has shown better electrical and heat-resistance qualities than natural mica, and it is expected that industry will continue to improve the product.

Between January and June, 1,075 short tons of mica was purchased under the Domestic Mica Purchase Program. Cumulative purchases under this program now total 22,933 tons.

## MOLYBDENUM

A laboratory scale open-cell fused-salt electrolytic process for producing high-purity molybdenum directly from its oxides was developed by the Bureau of Mines. The process may prove to be an outstanding contribution in the extractive metallurgy of molybdenum.

## NICKEL

About 3,000,000 pounds of DPA nickel was sold at market price on date of delivery, making a total of 15,052,000 pounds sold out of the 19,000,000 pounds authorized for disposal by OCDM in January 1960, with a recovery of \$11,138,000. Of the 2,000,000 pounds of DPA nickel available for direct Government use, only 500,000 pounds had been released as of June 30.

A contract was executed for the sale of approximately 3,431 short tons of nickel-cobalt-copper calcines and 87 short tons of nickel matte from the strategic stockpile, following Congressional approval of the disposal (Public Law 87-13) on March 29, 1961. Total recovery was \$716,500.

All bids received in May on the strategic stockpile offering of approximately 300 short tons of arsenical nickel ore and 1,400 short tons of nickel speiss were rejected as none represented an adequate return to the Government. An effort will be made to negotiate a higher price for these materials.

## OPIUM

The Department of Agriculture's opium poppy seedstock in Arizona has been increased to 400 pounds. Two poppy trials are being grown in Arizona for yield data on seed, capsules and morphine content.

## PLATINUM GROUP METALS

All the osmium (27 troy ounces) and ruthenium (51 troy ounces) available for disposal from the strategic stockpile and 308 troy ounces of the rhodium were sold for \$43,700. The remaining 2,207 troy ounces of rhodium will be offered at the rate of about 280 ounces each month until all is sold. Rhodium is an important element

in electroplating, and in alloy with platinum is used for electric resistors. It is also used in the chemical industries as a catalyst in the production of nitric acid and in glass industry equipment for extruding fibers.

## QUARTZ CRYSTALS

Notices of plans for the disposal of approximately 6,000,000 pieces of partially processed crystals and 100,000 pounds of subgrade crude quartz crystals were published in the Federal Registers of February 18 and February 24, respectively.

## QUINIDINE

Approximately 100,000 ounces of quinidine was sold from the stockpile for \$67,778, which leaves about 353,000 ounces for disposal under the present authorization.

## QUININE AND TOTAQUINE

During this period about 4,300,000 ounces of quinine was sold from the stockpile at a total recovery of \$466,500. There remains for disposal approximately 9,500,000 ounces of quinine sulphate powder. About 1,000 ounces of totaquine was sold from the stockpile, for experimental uses. It was determined in 1955 that neither of these materials need be stockpiled because new and more effective materials had been developed.

## RUBBER

In the period January through June GSA sold 12,246 long tons of rubber, with a contract value of \$8,279,336, from the strategic stockpile. This brings the total rubber sold under the disposal program to 110,117 long tons as of June 30, with a recovery of over \$91,429,000.

## SAPPHIRE

A notice of the proposed disposal of approximately 1,800,000 carats of natural and synthetic sapphire from the strategic stockpile was published in the Federal Register on January 14, 1961.

## SILK WASTE

Approximately 371,000 pounds of strategic stockpile silk waste was disposed of in two auction sales, with proceeds amounting to \$96,317. These sales bring to 552,000 pounds the quantity of silk waste sold since the disposal program began, leaving about 1,448,000 pounds of excess material to be sold. Sales are held at 60-day intervals, and it is anticipated that this disposal program will be completed by the end of fiscal year 1962.

## TALC

Notice of a plant to dispose of 42 short tons of block and lump steatite talc from the stockpile was published in the Federal Register on January

14, 1961. Of the 6,285 short tons of ground steatite talc authorized last year for disposal from the stockpile, over 2,000 was sold during this reporting period, with a recovery of \$14,000.

#### *VANADIUM*

In April, all the vanadium items announced in the Federal Register of August 11, 1960, were sold from the strategic stockpile for a total of \$202,000. These were: 2,950 short tons of lead vanadate concentrates, 18 tons of vanadium pentoxide and 4,309 tons of lead vanadate ore.

#### *VEGETABLE TANNINS*

In February OCDM authorized the disposal, either by transfer to other Government agencies

or by sale to Government contractors, of 650 long tons of chestnut, 2,100 long tons of quebracho and 650 long tons of wattle. Notice of these disposals appeared in the Federal Register of March 15. Express approval of the Congress is required before these materials may be released.

#### *ZIRCONIUM*

Approximately 2,570 short tons of zircon concentrates were sold from the strategic stockpile, for \$91,000, out of the 14,000 tons still available for disposal on January 1 of this year.

The Bureau of Mines successfully used electrolysis in a bath of molten salt to refine off-grade and scrap zirconium. The refined metal had a Brinell hardness of less than 90.

# Appendix A

## FINANCIAL SUMMARY OF STOCKPILE OPERATIONS AS OF JUNE 30, 1961

TABLE 1. STATUS OF OBLIGATIONAL OPERATIONS

Under PL 117 and PL 520 for The National Stockpile  
AS OF JUNE 30, 1961

AUTHORITY	APPROPRIATED FUNDS \$/	AUTHORIZATIONS FOR		TOTAL OBLIGATIONAL AUTHORITY (CUMULATIVE) \$/
		MAKING ADVANCE CONTRACTS \$/	LIQUIDATING OUTSTANDING ADVANCE CONTRACTS \$/	
Under PL 117 - 76th Congress				
PL 361 - 76th Congress, August 9, 1939	\$ 10,000,000	\$ -	\$ -	\$ 10,000,000
PL 442 - 76th Congress, March 25, 1940	12,500,000	-	-	22,500,000
PL 667 - 76th Congress, June 26, 1940	47,500,000	-	-	70,000,000
Under PL 520 - 79th Congress				
PL 663 - 79th Congress, August 8, 1946	100,000,000	-	-	100,000,000
PL 271 - 80th Congress, July 30, 1947	100,000,000	75,000,000	-	275,000,000
PL 783 - 80th Congress, June 25, 1948	225,000,000	300,000,000	-	800,000,000
PL 785 - 80th Congress, June 25, 1948	75,000,000	-	75,000,000	800,000,000
PL 119 - 81st Congress, June 21, 1949	40,000,000	270,000,000	-	1,110,000,000
PL 150 - 81st Congress, June 30, 1949	275,000,000	250,000,000	-	1,635,000,000
PL 150 - 81st Congress, June 30, 1949	250,000,000	-	250,000,000	1,635,000,000
PL 424 - 81st Congress, October 29, 1949	-	-	100,000,000	1,535,000,000
PL 759 - 81st Congress, September 6, 1950	365,000,000	-	240,000,000	1,660,000,000
PL 759 - 81st Congress, September 6, 1950	240,000,000	125,000,000	-	2,025,000,000
PL 843 - 81st Congress, September 27, 1950	573,232,449	-	-	2,598,232,449
PL 911 - 81st Congress, January 6, 1951	1,834,911,000	-	-	4,433,143,449
PL 233 - 82nd Congress, November 1, 1951	590,216,500	-	-	5,023,359,949
PL 253 - 82nd Congress, November 1, 1951	200,000,000	-	200,000,000	5,023,359,949
PL 455 - 82nd Congress, July 25, 1952	203,979,000	-	70,000,000	5,157,338,949
PL 176 - 83rd Congress, July 31, 1953	-	-	30,000,000	5,127,338,949
PL 428 - 83rd Congress, June 24, 1954	-	-	27,600,000	5,099,738,949
PL 643 - 83rd Congress, August 26, 1954	379,952,000	-	-	5,479,690,949
PL 112 - 84th Congress, June 30, 1955	321,721,000	-	-	5,801,411,949
PL 112 - 84th Congress, June 30, 1955	27,400,000	-	27,400,000	5,801,411,949
PL 112 - 84th Congress, June 30, 1955	3,000,000	-	-	5,804,411,949
PL 844 - 85th Congress, August 28, 1958	-58,370,923	-	-	5,746,041,026
Reincorporated by PL 255 - 86th Congress, September 14, 1959	22,237,000	-	-	5,768,278,026
PL 626 - 86th Congress, July 12, 1960	5,768,278,026	1,070,000,000	-	5,768,278,026
Total PL 520	\$5,838,778,026	\$1,070,000,000	\$1,070,000,000	\$5,838,778,026
Total PL 117 and PL 520				

- a/ Congressional appropriations of funds for stockpiling purposes.
- b/ Congressional appropriations of contracting authority for stockpiling purposes in advance of appropriation of funds.
- c/ Congressional authorization to liquidate outstanding obligations incurred under previously provided advance contract authority.
- d/ Cumulative total of appropriated funds and advance contract authorization, less authorizations to liquidate outstanding advance contracts.
- e/ Includes \$8,843,792 received from sale of stockpile materials for wartime consumption. Receipts were returned to Treasury, February 1948.
- f/ Cancellation of previously authorized authority to make contracts.
- g/ Includes \$211 transferred to operations account for rehabilitation of Government-owned material producing plants.
- h/ Includes \$44,000 transferred to Transportation and Public Utilities Service, CSA.
- i/ Includes \$430,000 transferred to Transportation and Public Utilities Service, CSA.
- j/ As of June 30, 1959 this amount included cash of \$52,350,792 and receivables of \$6,020,131.
- k/ Includes \$7,763,000 transferred to other CSA funds for classified and wage board salary increases during 1961.
- l/ Includes receipts from retention sales. Includes unobligated balance at June 30, 1961 to be transferred to General Fund Receipts.

SOURCE: GENERAL SERVICES ADMINISTRATION

APPENDIX A—CON.

TABLE 2 TOTAL OBLIGATIONS AND EXPENDITURES OF STOCKPILING FUNDS

Under PL 117 and PL 520 for The National Stockpile

CUMULATIVE AND BY FISCAL PERIOD, THROUGH JUNE 30, 1961

Fiscal Period	OBLIGATIONS INCURRED A/		EXPENDITURES B/	
	Net Change By Fiscal Period	Cumulative As of End of Period	By Fiscal Period	Cumulative As of End of Period
Prior to Fiscal Year 1948	\$ 123,871,685	\$ 123,871,685	\$ 66,330,731	\$ 66,330,731
Fiscal Year 1948	252,901,411	376,773,096	82,907,575	149,238,306
Fiscal Year 1949	459,766,881	836,539,977	304,486,177	453,724,483
Fiscal Year 1950	680,427,821	1,516,967,798	440,834,970	894,559,453
Fiscal Year 1951	2,075,317,099	3,592,284,897	655,537,199	1,550,096,652
Fiscal Year 1952	948,117,547	4,540,402,444	844,683,459	2,394,780,111
Fiscal Year 1953	252,375,163	4,792,777,607	906,158,850	3,300,938,961
Fiscal Year 1954	116,586,681	4,909,364,288	644,760,321	3,945,699,282
Fiscal Year 1955	321,799,833	5,231,164,121	801,310,094	4,747,009,376
Fiscal Year 1956 C/	251,692,667	5,482,856,788	382,011,786 C/	5,129,021,162 C/
Fiscal Year 1957	190,000,109	5,672,856,897	354,576,558	5,483,597,720
Fiscal Year 1958	54,473,250	5,727,330,147	173,753,997	5,657,351,717
Fiscal Year 1959	38,710,879	5,766,041,026	65,260,098	5,722,611,815
Fiscal Year 1960	19,859,290	5,785,900,316	49,227,142	5,771,838,957
Fiscal Year 1961	29,082,919	5,814,983,235	33,325,431	5,805,164,388

A/ Figures are the sum of obligations incurred under PL 520, 79th Congress and PL 117, 76th Congress. Final obligations under PL 117, 76th Congress were incurred in Fiscal Year 1949.

B/ Figures are the sum of expenditures under PL 520, 79th Congress and PL 117, 76th Congress. Final expenditures under PL 117, 76th Congress were made in Fiscal Year 1951.

C/ 1956 and subsequent fiscal periods and cumulative expenditures are reported on an accrual basis.

SOURCE: GENERAL SERVICES ADMINISTRATION

APPENDIX A--Con.

TABLE 3 EXPENDITURES OF STOCKPILE FUNDS, BY TYPE

(for the National Stockpile)

Cumulative and for Fiscal Year 1961

Type of Expenditure	Cumulative Through December 31, 1960 <sup>a/</sup>	Six Months Ended June 30, 1961	Cumulative Through June 30, 1961 <sup>a/</sup>
Expenditures			
Gross Total	\$6,329,977,505	\$16,836,587	\$6,346,814,092
Less: Adjustment for Receipts from Rotation Sales and Reimbursements	541,385,744	263,960	541,649,704
Net Total	5,788,591,761	16,572,627	5,805,164,388
Material Acquisition Costs, Total	5,428,406,302	2,026,948	5,430,433,250
Stockpile Maintenance Costs, Total	315,029,845	12,439,122	327,468,967
Facility Construction	43,772,457	0	43,772,457
Storage and Handling Costs	190,714,171	6,537,037	197,251,208
Net Rotation Costs	80,543,217	5,902,085	86,445,302
Administrative Costs	43,109,493	1,095,865	44,205,358
Operations, Machine Tool Program	2,046,121	1,010,692	3,056,813

<sup>a/</sup> Cumulative figures are the total of expenditures under PL 117, 76th Congress and PL 520, 79th Congress. Expenditures under PL 117 totaled \$70,000,000 of which \$55,625,237 was for materials acquisition costs and \$14,374,763 was for other costs. Final expenditures under PL 117 were made in FY 1951.

SOURCE: GENERAL SERVICES ADMINISTRATION

## Appendix B

### CHANGES IN STOCKPILE SPECIFICATIONS JANUARY-JUNE 1961

<i>Number</i>	<i>Item</i>	<i>Change</i>	<i>Effective date</i>
P-3-R2	Asbestos, Chrysotile	Revised	June 2
P-65-R	Chromite, Chemical Grade	Revised	January 5
P-96-R1	Chromium Metal	Revised	January 5
P-11a-R2	Ferrochromium, Low-Carbon	Revised	February 14
P-104	Ferrocolumbium	New	May 2
P-108	Ferromanganese (Low- and Medium-Carbon)	New	May 16
P-88-R1	Ferrotantalum-Columbium	Revised	March 17
P-29-R2	Manganese Dioxide, Battery Grade	Revised	June 16
P-98-R2	Manganese Metal, Electrolytic	Revised	May 17
P-109	Silicomanganese	New	May 17
P-83b-R1	Silk Nolls	Revised	April 18

## Appendix C

### SUMMARY OF GOVERNMENT INVENTORIES OF STRATEGIC AND CRITICAL MATERIALS

As of June 30, 1961

(Dollar Values based on June 30, 1961, market prices)

Total of Maximum Objectives  
for Strategic Stockpile  
\$4,446,968,900

	<i>Market value</i>
<b>I. <u>Total Inventories</u></b>	<b>\$7,798,642,200</b>
Strategic Stockpile .....	5,824,565,500
Defense Production Act .....	959,417,200
Commodity Credit Corp.....	106,543,500
Supplemental Stockpile .....	897,882,300
Federal Facilities Corp.....	10,233,700
<b>II. <u>Inventories Within Strategic Stockpile Objectives</u></b>	<b>4,408,322,400</b>
Strategic Stockpile .....	4,039,419,000
Defense Production Act .....	158,847,000
Commodity Credit Corp.....	58,770,800
Supplemental Stockpile .....	151,285,600
<b>III. <u>Inventories Excess to Strategic Stockpile Needs</u></b>	<b>3,390,319,800</b>
<u>Specification Grades of Materials with Objectives</u>	<u>3,104,242,300</u>
Strategic Stockpile.....	1,639,108,700
Defense Production Act.....	680,912,000
Commodity Credit Corp .....	47,077,800
Supplemental Stockpile .....	726,910,100
Federal Facilities Corp .....	10,233,700
<u>Nonspecification Grades of Materials with Objectives</u>	<u>120,541,100</u>
Strategic Stockpile.....	31,226,900
Defense Production Act.....	86,492,200
Commodity Credit Corp .....	262,400
Supplemental Stockpile .....	2,559,600
<u>Materials without Objectives</u>	<u>165,536,400</u>
Strategic Stockpile.....	114,810,900
Defense Production Act.....	33,166,000
Commodity Credit Corp .....	432,500
Supplemental Stockpile .....	17,127,000

## Appendix D

### REPORTS ISSUED BY THE DEPARTMENT OF THE INTERIOR JANUARY-JUNE 1961

#### BUREAU OF MINES

##### Reports of Investigations

- 5650 Tungsten Deposits of Cochise, Pima, and Santa Cruz Counties, Ariz.
- 5676 Heats of Formation of Cerium Sesquioxide and Bismuth Sesquioxide by Combustion Calorimetry.
- 5696 Evaluating One-half Million Pounds of Zirconium Sponge.
- 5711 Heats and Free Energies of Formation of Ferrites and Aluminates.
- 5715 Low-Temperature Heat Capacities and Entropies at 298.15°K. of Three Sodium Vanadates.
- 5716 Thermodynamic Properties of Aluminum Nitride.
- 5718 Three Chemosynthetic Autotrophic Bacteria Important to Leaching Operations at Arizona Copper Mines.
- 5720 Spectrophotometric Determination of Trace Amounts of Copper in Tungsten Metal Powder.
- 5722 Metallothermic Reduction of Vanadium Chlorides.
- 5726 Laboratory-Scale Casting Furnace for High-Melting Point Metals. (Zirconium, etc.)
- 5727 Rapid Determination of Aluminum, Iron, Copper, Cadmium, and Lead in Zinc-Base Alloys.
- 5728 Beneficiating Manganese Oxide Ores from the Butte-Philipsburg Federal Stockpile.
- 5740 Recovering Cobalt and Nickel from Complex Sulfide Ores of Southeastern Missouri.
- 5746 Determining the In-Place Support of Mine Roof with Rock Bolts, White Pine Copper Mine, Mich.
- 5747 Extraction of Zirconium from Nigerian High-Hafnium Concentrate.
- 5748 Caustic Sulfide Leaching of Mercury Products.
- 5750 Beneficiating North Carolina Spodumene-Beryl Ores.
- 5751 Experimental Treatment of Nevada and California Fluorspar Ores.
- 5756 Recovering Tin from Hardhead by Selective Oxidation of Iron.
- 5757 Thermal Expansion of Alpha Alumina.
- 5758 Electrorefining Zirconium.
- 5759 Production of Zirconium by the Semicontinuous Reactor Process.
- 5761 Thermal Behavior of Manganese Minerals in Controlled Atmospheres.
- 5764 Gas-Fired Vacuum Retort for Distilling Metals. (Zinc)
- 5765 Selective Flotation of Fine-Grained Lead-Zinc Sulfides from Idaho and Washington.
- 5767 Flotation of Beryl from Northeastern Pegmatites: A Progress Report.
- 5769 Physical and Mechanical Properties of Electrorefined Vanadium.
- 5770 Preparing Zirconium Diboride Directly from Zircon.
- 5773 Refining Crude Aluminum by the Subhalide Reaction.
- 5775 Electric Smelting of Montana Chromite Concentrates.
- 5777 Recovering Aluminum and Fluorine Compounds from Aluminum Residues.
- 5781 Using Molten Zinc To Extract Aluminum from Aluminum-Silicon Alloys: A Progress Report.
- 5783 Radiochemical Precipitation Studies of Rare-Earth Oxalates.
- 5784 Stress-Corrosion Cracking Susceptibility of Zirconium in Ferric Chloride Solution.
- 5786 Experimental Extraction of Strategic Components from S-816 Alloy Scrap. (Cobalt)
- 5791 Low-Temperature Heat Capacities and Entropies of Monotungstates of Sodium, Magnesium, and Calcium.
- 5793 Flotation Studies on Copper-Nickel Sulfide Ores from Deposits near Rockport, Maine.
- 5795 Electrowinning Molybdenum: Preliminary Studies.
- 5802 Flotation of Unoxidized Manganiferous Material from the Cuyuna Range, Minn.
- 5809 Defluorination of Siliceous Fluorspars at Elevated Temperatures.
- 5811 Volatilization of Tin Chlorides from Bolivian Low-Grade Ores and Concentrates.
- 5814 Spectrochemical Analysis of High-Purity Tungsten.



APPENDIX D--Con.

BUREAU OF MINES--Con.

**Information Circulars**

- 7984 Fluorspar Mining Methods and Costs, Ozark-Mahoning Co., Hardin County, Ill.
- 7985 Open-Pit Copper Mining Methods and Practices, Copper Cities Division, Miami Copper Co., Gila County, Ariz.
- 7990 Manganese Deposits of Eastern Arizona.
- 8014 Tungsten Deposits in Utah.

**Reports Placed on Open File for Public Inspection**

Nickel Content of Individual Samples Included in Composition of Enriched Zone Material.  
Percolation Leaching of Oxidized Copper Ores from the Mineral Hill Deposit, Yuma County, Ariz.  
Thermoelectric Measurements on Natural and Artificial Bornite and Related Compounds.

**U. S. GEOLOGICAL SURVEY**

**Professional Paper**

- 311 Geology of northeasternmost Tennessee. (Manganese, lead, zinc, uranium)

**Bulletins**

- 1032-F Petrography and origin of xenotime and monazite concentrations, Central City district, Colorado. (Rare earths)
- 1058-I Tofty tin belt, Manley Hot Springs district, Alaska. (Tin, gold)
- 1081-E Geology of the Lloyd quadrangle, Bearpaw Mountains, Blaine County, Montana. (Lead, copper)
- 1081-F Geology of the southern part of the Lemhi Range, Idaho. (Lead, zinc, copper)
- 1082-F Geology and fluorspar deposits, Northgate district, Colorado.
- 1082-G Areal geology of the Little Cone quadrangle, Colorado. (Vanadium, uranium)
- 1082-I Geology and mineral deposits of the St. Regis-Superior area, Mineral County, Montana. (Lead, zinc, copper, fluorspar)
- 1082-K Chromite and other mineral deposits in serpentine rocks of the Piedmont upland, Maryland, Pennsylvania, and Delaware.
- 1089-A Geology of the Alvord Mountain quadrangle, San Bernardino County, California. (Tungsten, gold)
- 1098-A Geochemical studies in the Coeur d'Alene district, Shoshone County, Idaho. (Lead, zinc, copper)
- 1098-B Geochemical prospecting abstracts.
- 1101 Vanadium-uranium deposits of the Rifle Creek area, Garfield County, Colorado.

**Map**

- I-326 Preliminary geologic map showing iron and copper prospects in the Juncos quadrangle, Puerto Rico.

